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DIALOG

I've been giving serious thought to getting myself a Macintosh. I've tried one in the store and it looks pretty decent. Thing is, I know that most of the hassles people have with systems don't show up until long after they get 'em home. What should I know that the ads don't tell me?

That's a shotgun question if ever there was one. What do you want to use this here Mac for?

Well, for most of the things people get computers for. I want to do some word processing, some programming, maybe call some bulletin boards...

The Mac is an innovative machine, to be sure... I'm not sure if I'd qualify it as the ideal all purpose computer. Its marvelous user friendliness comes with a generous helping of limitations and restrictions.

Such as...

To begin with, the Mac's superb graphics are possible because it uses a very capable processor. This doesn't make them particularly easy, though. In fact, as a rough comparison, when you take the processor overhead needed to run the computer's "background" functions away from its overall capability it's not that much more powerful than even a full house eight bit system.

It has more RAM.

Granted, it does. However, 68000 programs tend to be much larger than those written for, say, a Z-80. Some of that RAM will not be available to you for this reason.

It has a much more flexible screen display than any eight bit machine.

Unquestionably, and if screen graphics... albeit black and white ones... are your primary concern you can do no better than a Macintosh. However, you should consider what you are planning to do with those incredible graphics.

Well, to begin with, there's MacWrite. It would let me do all sorts of fancy fonts and type styles for letters, headings, titles, stuff like that...

Yes, MacWrite is a party to use. However, it has several decided limitations as a word processor. Again, if you remove the Macintosh dependent toys... in this case the neat typefaces... and compare it to software written for more commonplace machines it would qualify as a pretty low rent package.

What about third party software for the Mac?

We're starting to see the first dribbles of this, but I think that the ultimate deluge will be a while in coming. Quite a lot of good software starts off in people's basements, rather than coming from established software development houses. This will be especially true for innovative applications for the Mac beyond the usual word processors and spreadsheets. In order to develop such software, one needs programming languages... something which Apple was pretty tight on until just recently.

I think the graphics make up for quite a number of its weaknesses.

Yes, I would agree... assuming that you need them. I found, in using MacWrite, that after the initial playing period wore off I got pretty sick of looking at manuscripts that resembled ransom notes cut from old newspapers. There is a decided tendency to overuse the features of MacWrite.

Are there any good serious packages coming out for the Mac?

There are. We've seen things like Microsoft BASIC, several better word processors, Multiplan and so on. However, most of the stuff that has been appearing has been in the sphere of small utilities and interesting programs of indeterminate usefulness. I think that a lot of it is enjoying an artificially grand popularity because there is such a dirth of Mac software.

What are good reasons for buying a Mac, then?

The Macintosh is the perfect computer... well, make that a very good choice... for people who know nothing about computers, want to know even less but, at the same time, require access to the power of specific computer software. It's unquestionably the best box for idiots we've seen.

It's also a great computer for people who just get off on using very clever new technology. There's nothing really wrong in this... it makes life very easy and uncomplicated.

I think that the Mac is the wrong choice for users who are not afraid to learn to use complex software and plan to make extensive demands of it. None of the Mac applications we've seen to date have been poorly written, but all of them have run up against the limitations of both the hardware and the requirement of using all the Mac's icons, menus and other paraphernalia.

Experienced users, or ones who plan to make enough use of the computer to get there in time, will eventually find the Mac extremely frustrating.

It sounds like a good machine that I'll grow out of soon.

That depends a lot on how much you figure on growing. It's certainly the least likely machine to turn you off computers at the start... it just may not keep you turned onto them as long as a more conventional... and flexible... system would.

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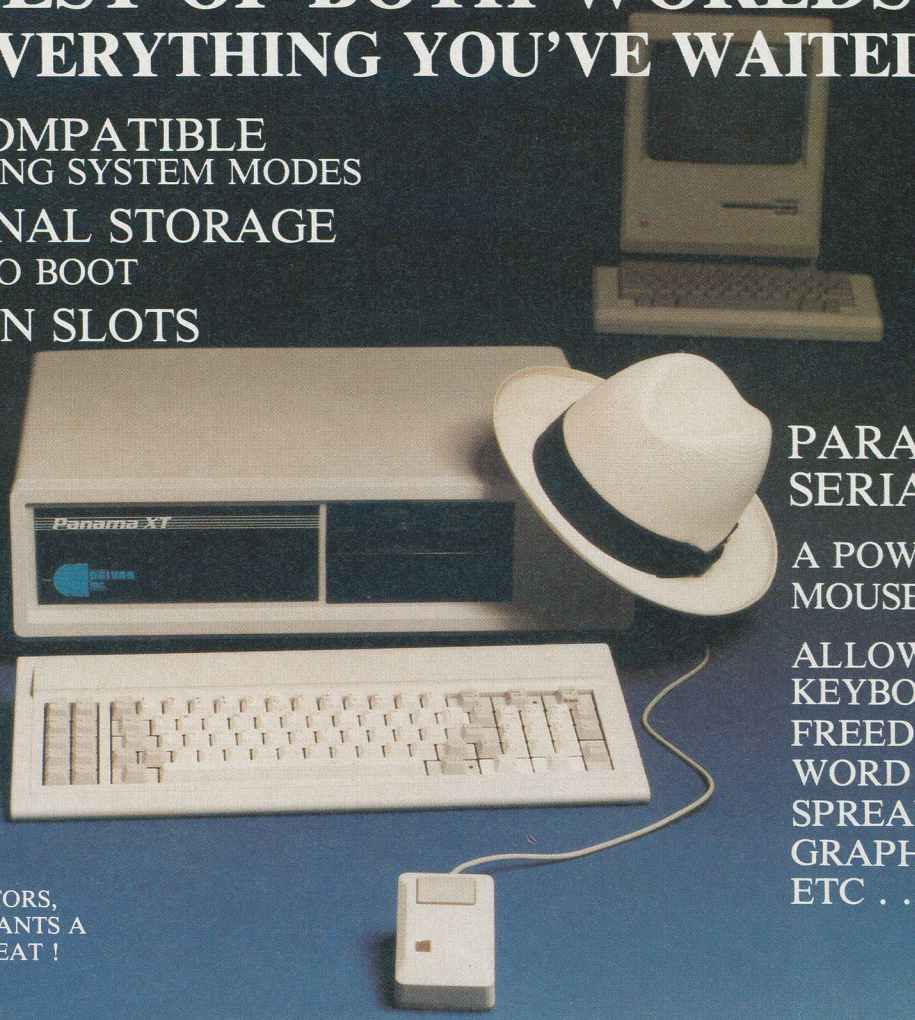

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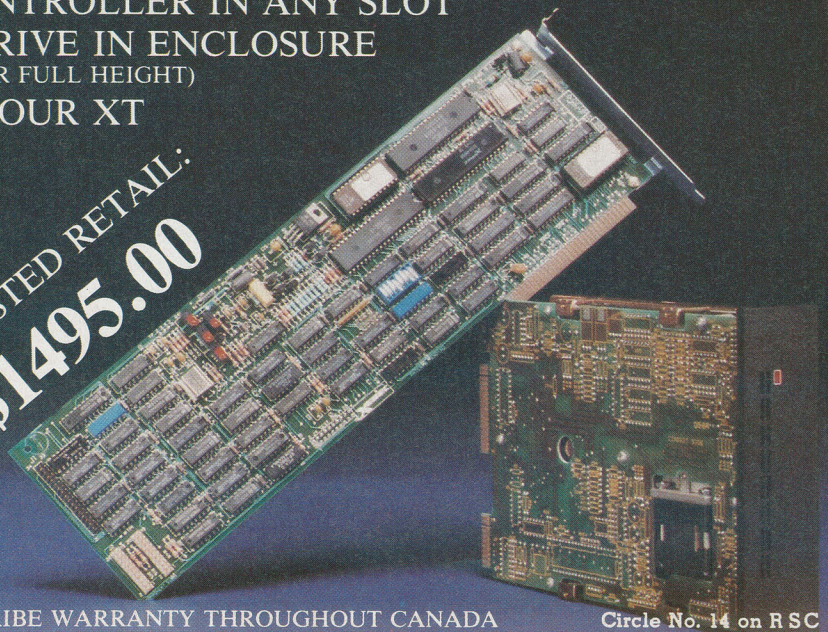

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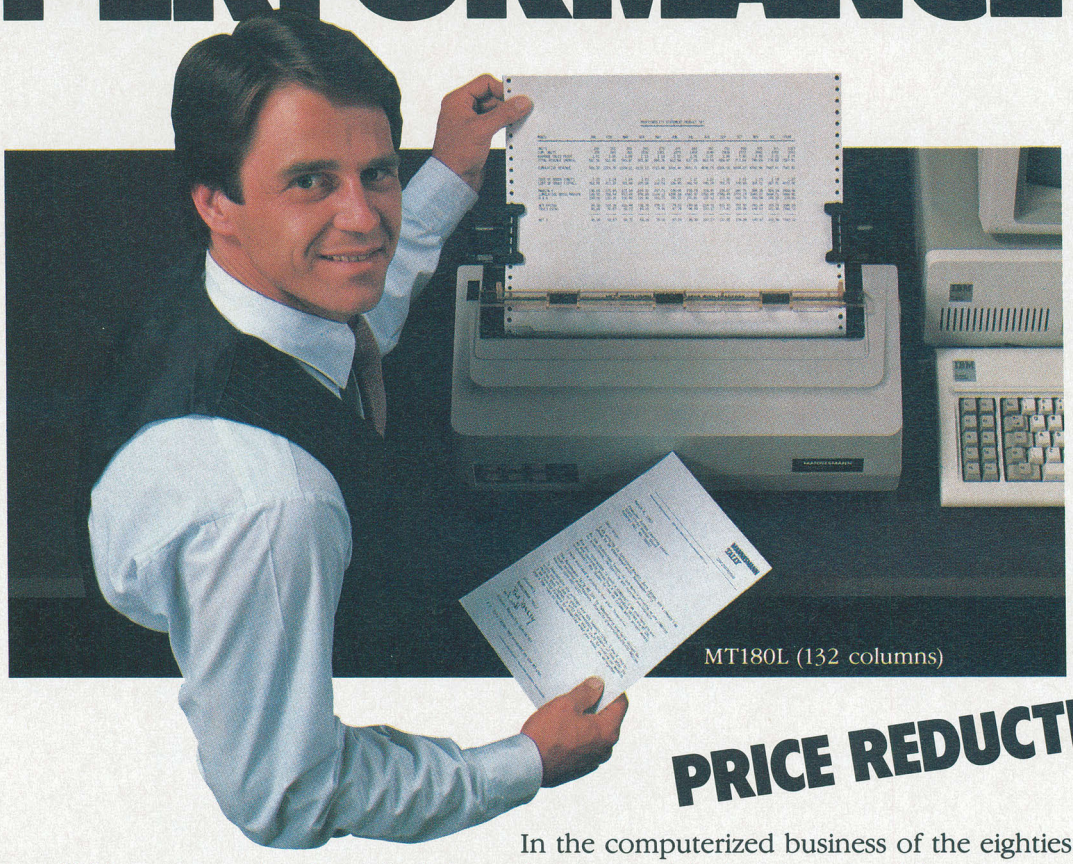

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COMPUTER PRESS

Software R&D

VANCOUVER, B.C. — The *Canadian Association of Data Processing Service Organizations* feels that the costs incurred in the development of software designed for sale to third parties should be **tax deductible.**

President Bill Boggs, during a meeting in Vancouver, stated that the federal government had been urged by the association to change its policy regarding software development costs.

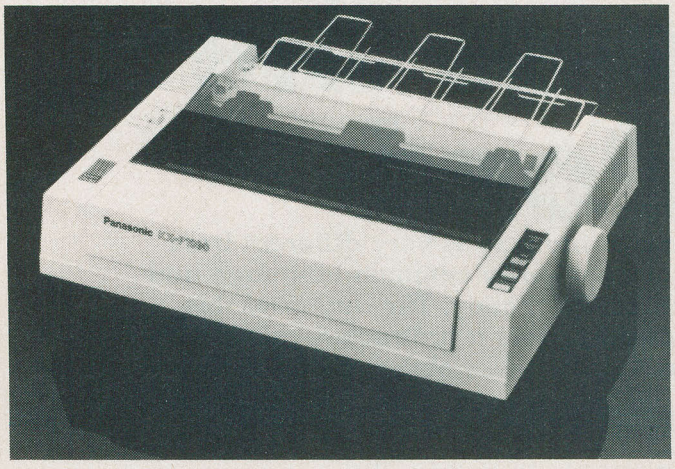
The association feels that, excepting post-sale maintenance costs, software development can be categorized, and should be tax deductible, as research.

Panasonic News

MISSISSAUGA, ONTARIO — An array of business computing products are being released by *Matsushita Electric of Canada, Limited* under the company's brand name of *Panasonic.*

Two new **dot matrix printers** are available now, and that line will be expanded with higher capability models, as well as a letter quality printer line and a line of microcomputers.

Matshushita presently produces a handheld computer, The Link, and expects to be marketing an 8088-based transportable IBM compatible micro, pending government approval.



Important Notes

In our Computing Now!'s *September computer survey*, **Micro Bazzar** was listed as the Canadian distributor for Kaypro computers. The distributorship is, however, shared by **Computron.** Interested parties can contact Computron at either 10641-123 Street, Edmonton, Alberta T5N 1P3 (403) 482-7363; or 55 Torbay Road, Unit 2, Markham, Ontario L3R 1G7 (416) 477-0828.

The *Syntauri software* for the Classic music system reviewed in the September issue of Computing Now! is available in Canada from **Remenyi House of Music,** 210 Bloor Street West, Toronto, Ontario M5S 1T8 (416) 961-3111. Besides being helpful and knowledgeable, the lads at Remenyi are rather closer than California.

NOTE TO READERS — The covers in the Directory of Microcomputer and Electronic Retailers in Canada dividing computer and electronic outlets were reversed in printing. We apologize for any inconvenience this causes.

Contest Winner

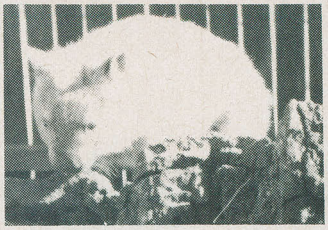
COMPUTING NOW! — The response to the *First Computing Now! Summer Contest* in the July 1984 issue of CN! was incredible. From the mass of mail we received, the entry of **Albert Lee** of Pinawa, Manitoba was randomly drawn.

Albert wins the *Smith Corona L1000* daisy wheel printer for his 14 line program that correctly computes and prints all 70 perfect numbers from 10 to 1000.

Reader Supplied Wombat

Among the rich and flowing tapestry of unusual zoology that flows through the pages of Computing Now! each month, the proud, gracious wombat figures quite prominently. A long time CN! reader, William Patterson, recently returned from Australia... which is where wombats live... and sent this photograph along.

This is a mature wombat, which Bill discovered staring greedily at the "aborigine surprise" breakfast he had been served outside the cave his travel agent had booked him



into. Wombats are not stupid, despite their fairly thick appearance and, upon realizing what it was contemplating, this specimen quickly glanced at its watch saying "Sorry, mate... I forgot the time. Must run... I've tickets to the kangaroo roast in Tasmania."

Now you know what they really do look like.

Continued on page 83

Next Month In Computing Now!

PC Now! Strikes Again

The IBM PC suppliment we featured in our June 1984 edition of Computing Now! brought us a lot of good vibes from our readers so we've decided to do it again. The November PC Now! will feature a complete survey of all the IBM compatible systems... a lot of them have changed since the last time we scanned 'em. We'll also be looking at some of the more sophisticated approaches available for programming the creature. If you own an IBM PC or a compatible system... or if you're just considering buying one... your piteous spirit will haunt the Earth for millennia in abject sorrow if you miss this issue. Really.

Joe Sutherland's Rodent Ranch

Up to his naval in computers, the always mythical lord Sutherland donned peasant garb one day and left his castle incognito. He journeyed far across the countryside seeking fulfillment until finally, he realized that his destiny was to become a mouseherd. The result of all this was the JLS mouse, a PC peripheral which, unlike most mice, plugs in between the keyboard and the computer, simulating the cursor movement keys in response to the scurrying of the trackball. It's a party.

Eight Inches for Fruit

The Apple's microscopic disk drives have always been among its most severe limitations. Next month we're going to look at adding new drives... bigger, finer drives... to the Apple. The new controller card allows for double sided double density drives each holding somewhat over a megabyte... where once there was scarcely more than a hundred K.

Computers Across the Pond

The British computer industry is very different from our own, despite our obviously common language and the same queen on our money. The author of this feature has just returned from a protracted vacation in Britain and offers these observations.

By Halvor Moorshead

A hundred years ago countries operated largely independently of each other. National boundaries... and certainly geographical barriers, such as oceans... were quite good at isolating ideas and fashions.

Contemporary fads tend to be global. Something achieving popularity in one country can be reasonably expected to make its way through most of the Western world. As examples we have CB radio, skate boards, digital watches and so on. To the casual observer it seems to be the same with microcomputers. It isn't as simple as that, however.

Watchers of the North American computer industry will probably find concensus in one conclusion at least... things are extremely fluid at the moment. It would be foolhardy at best to offer any decisive predictions about where things are going. This is an issue of some concern to businesses whose financial existences are based on the directions computers take.

An accurate prognostication of the nature of the next generation of microcomputer development will also be of interest to users of computer technology, if only for the satisfaction of knowing that one's equipment is not about to be rendered obsolete.

The difficulty one has in arriving at such a conclusion is a result of microcomputers not really being a fad, such as CB radios and skate boards, but more of a social watershed, such as television. It has been a long time since there has been one of these... there is nothing, really, to measure it against.

For observers wishing to get some sort of handle on the North American computer industry it may prove valuable to have a look at how things are doing in a similar social environment. Perhaps the best example would be microcomputers in Great Britain.

Union Jack But No Jane

The use of computers is big in Britain, probably bigger than anywhere else in the world if you deal only in numbers. However, clearly, it has developed very differently from the situation in North America.

One cannot fail to be impressed by the widespread influence of computers in Britain. The small town near where I was staying, Harwich, having a population of perhaps ten thousand, has two dedicated micro stores plus two chain outlets with computer sections. Harwich is about twenty miles from a much larger city, itself with at least twenty computer stores.

Even the British equivalent of the convenience store, the local tobacconist newsagent, will often have software for sale.

Microcomputing also has its own dedicated radio and television shows. Several of the national papers have major columns or sections devoted to microcomputers.

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Figure 1. This mail order ad from a British magazine gives a fair idea of the prices of things. The exchange rate is about $1.75 to one pound. VAT is sales tax (15%) and this ad is unusual in that it is not included in most prices. The photographs were just as bad in the original as they are here.

The estimates of the numbers of systems in use vary greatly, ranging from two and a half to five million. Even the lowest estimate would mean that "computer saturation" is three times that of what it is in Canada per head. If there are any signs that the popularity of computers has reached its peak, I didn't see them.

The differences between these two computer industries are however much greater than just numbers. Britain represents a huge home computer market concentrated at the lower price end. The first clue to this is in the tobacconist newsagents. The software they are selling is virtually all on cassettes and nearly all games. The magazines seem to be heavily biassed toward games both in their editorial and advertising.

A closer investigation reveals that there is also a lot of interest in programming and, although games seem to dominate, there is still a lot of interest in other areas.

Hardware

The brand names of many of the computers will seem strange to North American eyes. The weekly computer magazines...there are three of them... each produce a popularity chart for both hardware and software much like the music charts. From this it appears that the top selling computers are the Sinclair *Spectrum,* the *BBC* microcomputer, the Acorn *Electron* and the more familiar *VIC–20.* With the exception of the PC *jr,* all the major names from the States and Japan are available but only Commodore with the *VIC–20* and the *64* have any significant market share.

At the expensive end, the IBM *PC* has failed to capture the imagination as it has here. This may be because of the current exchange rate, making American imports expensive, or because the British do not seem to hold imported technology in awe. The *PC* is not seen as the only safe choice for business. At this end of the market a machine known as the *Apricot* seems to be doing well. A review on television rated it better than the PC.

In Canada we would assume that anything called an *Apricot* would be an Apple clone but in fact it is MS–DOS based. The British don't use the word "clone" but, rather, "work–alike" which, I suppose is an equally good description.

If clones are available, I didn't come across them or anyone who knew much about them.

The average cost of the popular computers in Britain is rather lower than it is here. This is not because computers are cheaper than they are in Canada... for a given model they they cost roughly the same, although quoted prices always include a fifteen percent sales tax... but the volume market is for the less expensive models. The Spectrum... with colour, sound and forty–eight K... sells for about two hundred and twenty–five dollars. At the higher end of the popular range is the BBC micro with thirty two K of memory at about seven hundred dollars.

Disk drives are much rarer in Britain than they are in Canada. Cassettes dominate as the popular mass storage

Computers Across the Pond

medium, even in some business applications... including word processing.

A lot of Spectrum owners, the largest group, consider the first stage of upgrading from a cassette to be a "microdrive", a fast cassette type streamer costing well under half that of a disk. These hold eighty-five K each and are claimed to give an typical access time of three and a half seconds. They will load a forty-eight kilobyte program in nine seconds. Eight microdrives...each costing just under ninety dollars... can be hooked up to each interface.

The British also use monitors far less than we do. The television set is the standard. Again, this applies to business use as well as in the home. The Commodore *64* ... attached to a standard broadcast receiver... has succeeded in projecting itself as a business system. I even came across one company using several of them as word processors.

The product that is exciting people at the moment is the Sinclair QL... that stands for "Quantum Leap". It features a hundred and twenty-eight K of memory and two microdrives. It comes bundled with a spreadsheet and word processing software. The whole package costs the equivalent of about seven hundred dollars. Although announced at the beginning of 1984, deliveries have only just started.

Magazine reviews of the *QL* are generally favourable but it has been criticised for being slow. It was originally announced that this would be launched in the States this fall at under five hundred dollars. There are, however, reports of major production problems. Don't hold your breath.

Software

The average cost of cassette software in Britain was about twelve dollars until recently but severe competition is reducing this. One major distributor has cut its line to about three and a half dollars per tape, reportedly to try to overcome software piracy.

Piracy has become just as serious a problem in Britain as it is here. It is very hard to protect cassettes as they can so easily be copied as audio programs. Of the software in use, about ninety-five percent is pirated according to the software publishers.

Even so, some six million cassettes are expected to be sold in 1984.

In general people do not think much about operating systems. In talking to a teacher about this, I had to explain what CP/M and MS-DOS were. To confirm that this was not isolated, the television show that reviewed the *Apricot,* made no mention that it used MS-DOS, a parameter we would consider very important.

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ZX Microdrives use the Spectrum's own power supply.

Your first Microdrive is connected to Interface 1 by a Microdrive lead. Then, up to 7 more Microdrives can be added using Microdrive connectors. That gives you a minimum of 680K bytes of on-line capacity.

With memory like that, the possibilities are limitless – stock control, word-processing, even huge adventure games!

With each Microdrive, you'll receive a Microdrive connector and Microdrive demonstration cartridge. Blank Microdrive cartridges cost £4.95 each. They are available in packs of 4 (with a free cartridge wallet) or singly.

ZX Interface 1 – the multi-purpose controller. £49.95

ZX Interface 1 is a multi-purpose device. It controls up to 8 Microdrives. And it adds file-handling and communication facilities to your Spectrum.

So in one low-priced unit, you also get these two built-in features:

- **RS232 interface** This industry standard interface allows you to link your Spectrum with full-size printers, communicate with other computers employing RS232, and transmit data over telephone lines via modems.
- **The ZX Net** Now you and your friends can transfer programs and data on a local area network – or even play computer games together.

The ZX Net makes it easy, and fast!

It links between 2 and 64 Spectrums, transmitting at 10,000 characters per second. (So a full screen is transferred in around 3 seconds!) With the ZX Net, only one person need type in a program. And a Microdrive or printer can be shared by everyone in the network!

ZX Interface 1 offers you all these facilities, and retains the same peripheral port as the Spectrum itself.

With each ZX Interface 1, you'll receive a connecting lead for the first Microdrive; a ZX Net lead with jack plugs; plus a comprehensive manual.

An RS232 lead is available as an optional extra at £14.95.

Available from: larger branches of Boots • WH Smith Computer Stockists • Greens Computer Centres • Spectrum Computer Stores • and larger branches of John Menzies • Dixons • Laskys • Currys • John Lewis Partnership • Rumbelows • British Home Stores • House of Fraser and many other good computer stockists nationwide.

Find out more – in your local shop!

The best way to evaluate ZX Microdrives and Interface 1 is to see them for yourself.

There is a full range of ZX peripherals – including ZX Interface 2 for joystick and ROM Cartridge capability, alongside the only computer that supports them – the ZX Spectrum!

For more information, telephone Sinclair Research Ltd, on 0276 685311.

℗ Sinclair, ZX, ZX Spectrum, ZX Microdrive, ZX Net and ZX Interface are trade marks of Sinclair Research Ltd.

sinclair

Figure 2. The microdrives from Sinclair are not true disks but fast cassette streamers. The interface for the popular Spectrum system, capable of handling up to eight drives, costs about $87 as does each drive. The access time is claimed to be typically 3.5 seconds.

The exception to this lack of interest is the excitement about *MSX,* a new standard for low end systems adopted by many Japanese builders which will entail having all cassettes interchangeable. No MSX systems are available at this writing... the first are expected in September. These are expected to have a major impact on the market.

The dominance of cassettes has one interesting sideline.

One of the television programs concerning microcomputers has no title music... instead it broadcasts programs on the audio channel. They tell you which system the program being transmitted is for but not what the program does. I couldn't find anyone who had actually tried to use any of this "airware".

The radio shows also put out software over the air. Educational programs are also distributed in this manner.

FALL 1984

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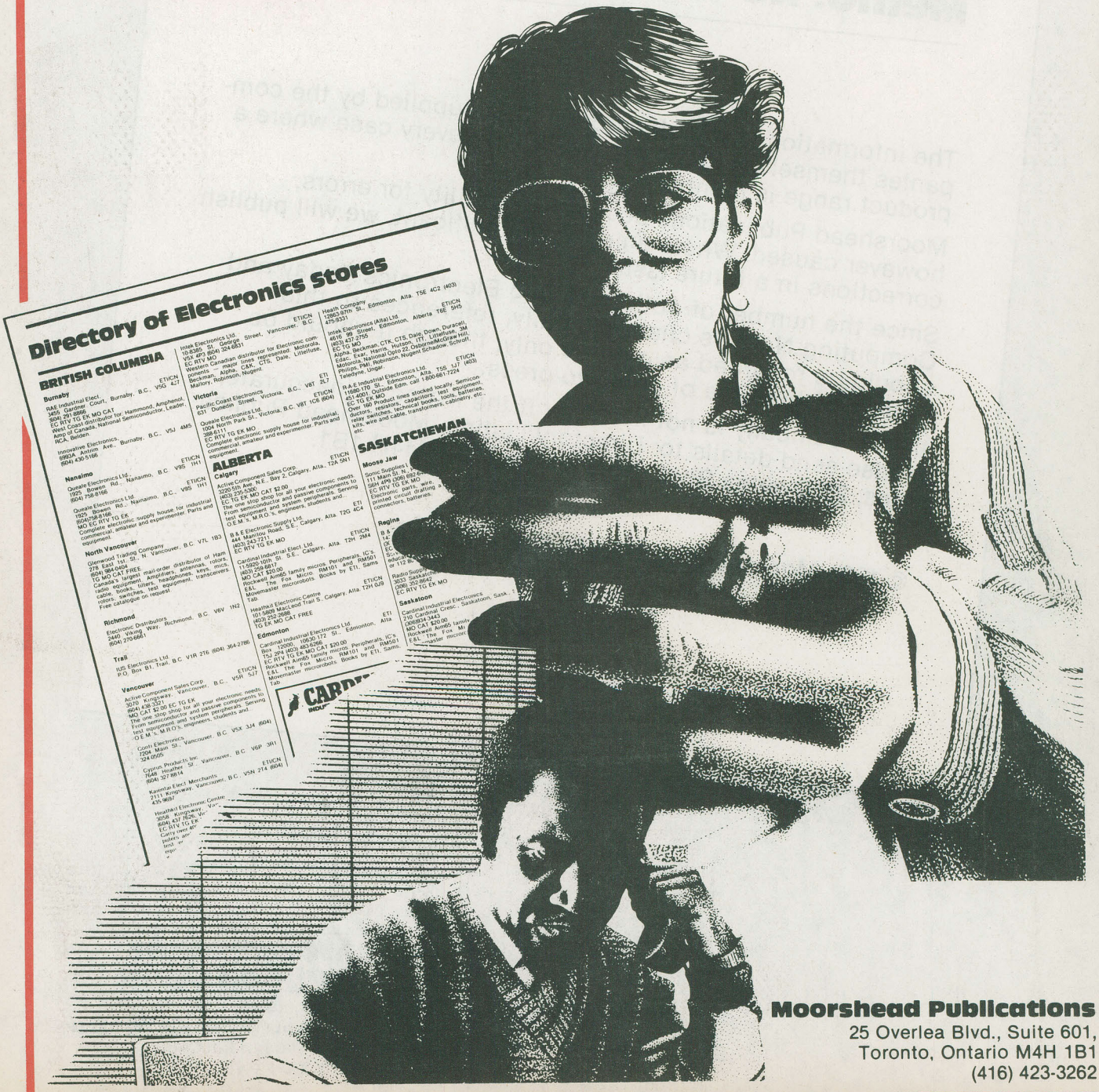

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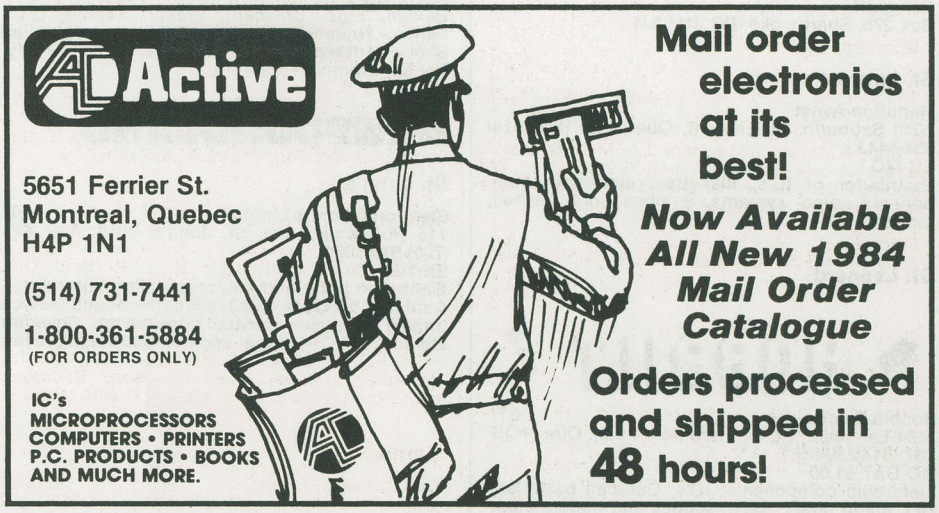

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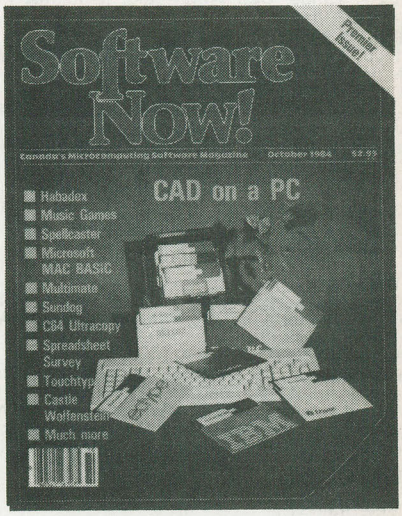

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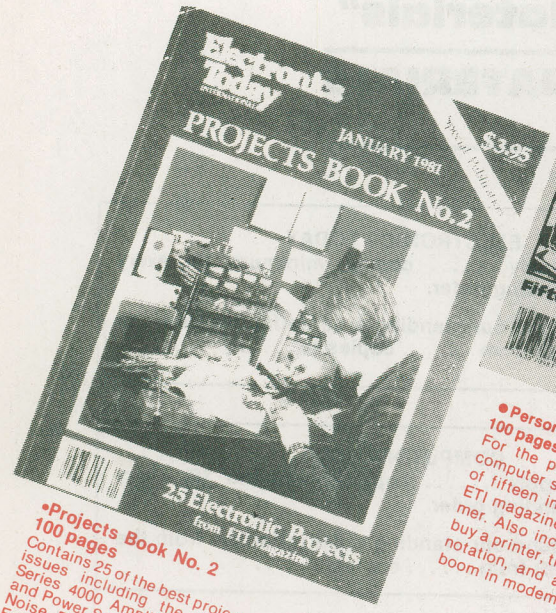

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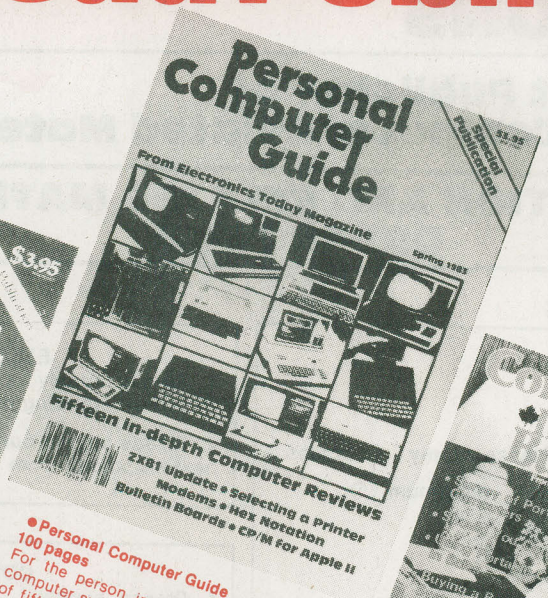

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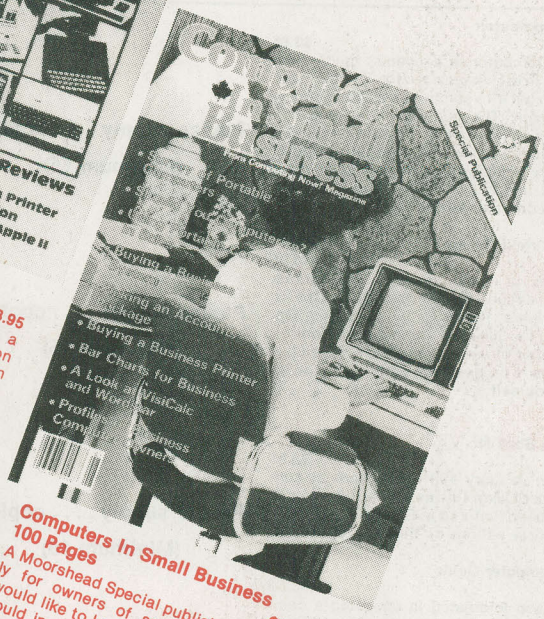

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There are a number of areas of programming which are turkeys to handle both in higher level languages and with an assembler... although usually for different reasons. String handling is one of these... BASIC and PASCAL are pretty decent at manipulating strings, but they do so very gracefully... with a dignified, glacial dirth of alacrity. Writing string handling stuff in assembler is a bit like bathing a hungry wombat in a tub full of cherry jello.

It's surprising how many people never get into either experience.

The lowly sorted directory program is a good example of one of those really nasty bits that doesn't come easily at either level. It would be impractical to boot BASIC and run the program every time one wanted to see what was on one's disk. However, there is some mind crackingly heavy code involved in doing it in assembler.

Rather than get too involved in the most practical solution, which is to distort the matrix of the time space continuum so that the BASIC implementation of this program appears to execute instantaneously... or even before you run it if you'd prefer... I figured that it would be a better learning experience to see how the assembler approach would transpire. This is not so slick as the Einsteinian mind warp, to be sure, but it uses less source code, decidedly an advantage.

Sheep

One of the things that's quite important in doing a magazine is not winding up with a "wall of type" effect. This is to say that you don't really want to have pages which are just line after line of copy with nothing to break it up, as it's hard to read. For this reason one generally introduces what are called *side heads*, those little black titles, every so often. It's not all that important that the side heads mean anything, and it's quite forgivable to simply use whatever comes into your head when one is needed. Just the other minute I was thinking about sheep.

However, I digress.

The sorted directory program, most often called D.COM, is one of the most useful utilities going. A typical version will read the directory listings, sort them alphabetically and present them with their approximate file sizes in K. Some directories will avail you of other information as well, such as the number of files on the disk and the amount of space they take up.

Despite the apparent complexity of this, it's possible to write such a program so that its eventual COM file occupies less than one kilobyte. Thus typing D will cause the directory to spill out onto your tube about as quickly as it would have, in a crude, unsorted form, if you had typed DIR.

There are, however, a number of problems to be overcome in getting all this together. In fact, the directory program is an interesting heap of code because it combines a number of diverse and generally useful routines. Having got a directory program together you will have several subroutines which can be used in later programs to do more impressive stuff, like counting air molecules or arranging the sum of man's knowledge in alphabetical order.

The component parts of a sorted directory are, in fact, a mechanism for getting the names of the directory entries into memory, another one for finding out how big the files are, a collection of trolls which can be goaded into sorting the entries alphabetically and, finally, a routine to print them out, converting their binary sizes into decimal representations.

The program shown here does all of that stuff. It's not a really great sorted directory... there's a better, and much faster, way of ascertaining the sizes of the files. However, this implementation will serve to illustrate how all this flotsam actually operates without too massive a typing orgy... if you understand the structure of the program well enough you'll be able to add the required code involved in speeding it up.

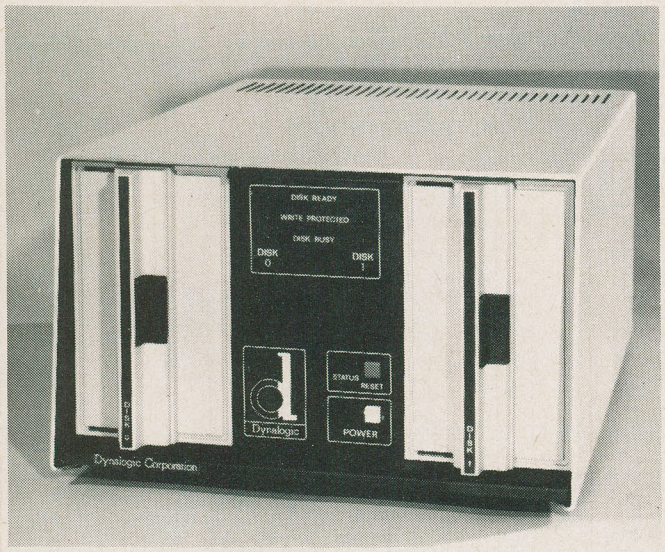
```
;;;
```

The Art of the Sorted CP/M Directory

```
        JP NEXTENT                      ;... IF SO, TRY NEXT TWO
        CMP M ! JM SWAP                 ;SWAP ENTRIES IF NEED BE
        DCR B ! JZ NEXTENT              ;TWO IDENTICAL ENTRIES
        INX H ! INX D ! JMP BLOOP       ;GET NEXT TWO ENTRIES

SWAP    MVI A,255 ! STA FLAG            ;SET THE FLAG
;EXCHANGE THE ENTRIES POINTED TO BY D & H
        POP B ! POP D ! POP H ! PUSH H ! PUSH D ! PUSH B
        MVI B,13
SWAP1   MOV C,M ! LDAX D ! MOV M,A ! MOV A,C ! STAX D
        INX H ! INX D ! DCR B ! JNZ SWAP1

NEXTENT POP B ! POP D ! POP H           ;POINT TO NEXT PAIR TO SORT
      XCHG ! PUSH H ! LXI D,13 ! DAD D
      XCHG ! POP H
      DCR B ! JNZ OLOOP                 ;LOOP THROUGH WHOLE TABLE
      LDA FLAG ! CPI 0 ! JNZ SLOOP      ;IF THERE WAS A SWAP, GO AGAIN
      RET
; ------
```




```
NEWLINE:
        MVI C,9 ! LXI D,CRLF ! CALL BDOS ! RET
; ------
DECOUT:
;VALUE IN HL WILL BE PRINTED IN DECIMAL ON THE TUBE
        JMP     DECL
DEC1    PUSH H ! PUSH D ! PUSH B        ;SAVE ALL REGS
        LXI B,-10 ! LXI D,-1
DEC2    DAD B ! INX D ! JC DEC2
        LXI B,10 ! DAD B ! XCHG
        MOV A,H ! ORA L ! CNZ DEC1
        MOV A,E ! ADI '0'
        MVI C,2 ! MOV E,A ! CALL BDOS
        POP B ! POP D ! POP H
        RET
DECL    CALL    DEC1
        RET
; ------
;
;       THE FEATURE ATTRACTION...
;
START:
; GET PRAMETERS, IF ANY
        LDA 005CH ! STA FCB ! STA FBUF          ;GET DISK PARM

        LDA 005DH ! CPI ' ' ! JZ NOPARM         ;SKIP IF NO SPECIFIER
        LXI H,005DH ! LXI D,FCB+1 ! MVI B,11    ;...OR POINT TO
PLOOP   MOV A,M ! STAX D                        ;...DE TROLL &
        INX D ! INX H ! DCR B ! JNZ PLOOP       ;...MOVE IT

NOPARM  LXI H,0 ! DAD SP ! SHLD STACK ! LXI SP,STACK
        MVI C,9 ! LXI D,HELLO ! CALL BDOS       ;SAY "HI WORLD"
        MVI C,26 ! LXI D,DMA ! CALL BDOS        ;SET DMA BUFFER

        LXI H,BUFFER ! SHLD BUFPNT              ;INITIALIZE BUFPNT
        MVI C,17 ! LXI D,FCB ! CALL BDOS        ;SEARCH FOR FIRST
        CPI 255 ! JZ NOFILE                     ;IF NO FIRST, SAY SO

SHOW    RLC ! RLC ! RLC ! RLC ! RLC             ;POINT TO ENTRY
        LXI D,0 ! MOV E,A ! LXI H,DMA           ;AND ADD TO POINTER
        DAD     D
        INX     H                       ;SKIP STATUS BYTE
        MVI     B,11                    ;GET NUMBER BYTES IN NAME
        XCHG                            ;SAVE H IN D
        LHLD    BUFPNT                  ;GET POINTER INTO TABLE
        XCHG                            ;INTO D
MLOOP   MOV     A,M                     ;MOVE THE NAME INTO THE BUFFER
        STAX    D
        INX H ! INX D ! DCR B ! JNZ MLOOP

        XCHG                            ;SAVE H N D

        INX H ! INX H                   ;LEAVE ROOM FOR FILE SIZE
        SHLD BUFPNT                     ;STORE POINTER
        LXI H,FILES ! INR M             ;BUMP THE COUNT UP
        MVI C,12H ! LXI D,FCB ! CALL BDOS
        CPI 255 ! JZ INBUF              ;GET NEXT FILE
        JMP SHOW                        ;AND BLAST IT AGAIN

; WE COME HERE, BOWING AND SCRAPING, WHEN THE TASK IS DONE

INBUF   CALL    BUBBLE                  ;SORT THE DIRECTORY
        LXI H,BUFFER ! SHLD BUFPNT      ;INITIALIZE BUFFER
        LXI H,FILES ! MOV B,M           ;GET THE FILE COUNT

SEEBUF  PUSH    B                       ;...AND SAVE IT
        LHLD    BUFPNT                  ;GET POINTER
        MVI     B,11                    ;SET UP 11 BYTES
DLOOP   MOV     E,M                     ;AND PRINT THE
        MVI     C,2                     ;ENTRY
        PUSH H ! PUSH B
        CALL BDOS
        POP B ! POP H
        INX H
        DCR B ! JNZ DLOOP

        CALL    SIZE                    ;SEE HOW BIG THE FILE IS
        INX H ! INX H                   ;SKIP THE BLANK
        SHLD    BUFPNT                  ;UPDATE POINTER

        LDA COUNT ! CPI MAXNUM-1 ! JNZ NOCR     ;DO WE NEED CRLF?
        CALL    NEWLINE                 ;DO IT IF NEEDS BE
        MVI A,0 ! STA COUNT ! JMP GETNEXT       ;RESET COUNTER
NOCR    MVI C,9 ! LXI D,SEP ! CALL BDOS         ;PRINT SEPARATOR
        LXI H,COUNT ! INR M                     ;BUMP COUNT

GETNEXT POP     B                       ;RESTORE COUNTER
        DCR B ! JNZ SEEBUF              ;...AND SEE IF WE'RE DONE

        MVI C,25 ! CALL BDOS            ;RETURN CURRENT DRIVE
        ADI 'A' ! STA CURDR             ;SAVE IN MESSAGE

        MVI C,9 ! LXI D,SUMMARY ! CALL BDOS     ;START SUMMARY LINE
        MVI C,32 ! MVI E,255 ! CALL BDOS        ;FETCH USER AREA
        LXI H,0 ! MOV L,A ! CALL DECOUT         ;SHOW THE GORY RESULTS
        MVI C,9 ! LXI D,SUM1 ! CALL BDOS        ;CONTINUE WITH SUMMARY
        LHLD WSPC ! CALL DECOUT                 ;PRINT TOTAL FILE SPACE
        MVI C,9 ! LXI D,SUM2 ! CALL BDOS        ;YET MORE SUMMARY
        LDA FILES ! LXI H,0 ! MOV L,A ! CALL DECOUT     ;NUMBER OF FILES
        MVI C,9 ! LXI D,SUM3 ! CALL BDOS        ;FURTHER ADVENTURES
        JMP     QUIT                            ;AND WE GONE

NOFILE  MVI C,9 ! LXI D,NFILE ! CALL BDOS       ;SAY NO FILE, JACK
QUIT    LHLD STACK ! SPHL ! RET                 ;RESTORE STACK

        DS      90
STACK   DS      2                               ;OLD STACK POINTER
BUFFER  DS      2       ;START OF DIRECTORY ENTRY BUFFER

        END
```

Sheepware

The structure of this program is a bit atypical, in that all the subroutines and fixed stuff are at the top. This is actually a pretty good way to debug code like this, as most of the multilegged beasties show up in the subroutines. The main code, after START, is really pretty straight up.

Herding along to the details...

There are actually a couple of ways to get the disk directory information into memory... the one which I've used here is the simplest. It involves the application of a couple of BDOS calls.

The BDOS provides a way to search for the first occurrence of a file and, thereafter, to search for all subsequent occurrences. Since a file name can contain ambiguous references... *wild cards* to the plebs... there can be more than one occurrence of any given name.

When you tell CP/M to do something to a file called *.* it creates a file control block... the FCB... which holds eleven question marks. That's eight for the name and three for the extension. A specification like FLAT*.CAT would translate into FLAT????CAT. This, however, is different from FLAT.CAT, which would come out as FLAT CAT... the latter contains no ambiguity, and, as such, would feature no question marks.

The first thing the directory program will want to do is to find out if, having been called, it is supposed to show the entire directory or just selected highlights. If you type D B:*.CAT you will want it to spew out a directory of drive B for all files of the extension CAT.

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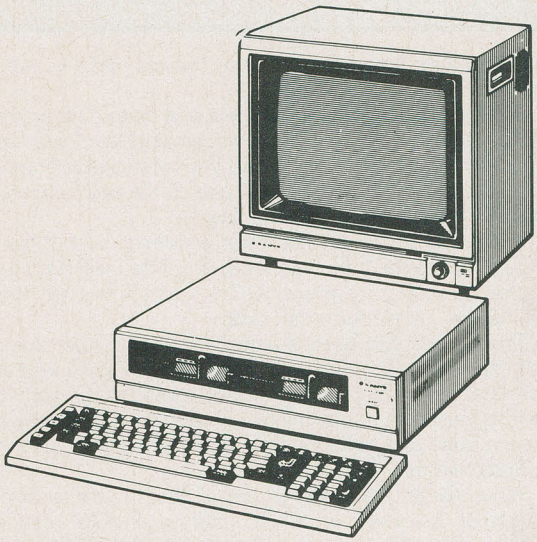

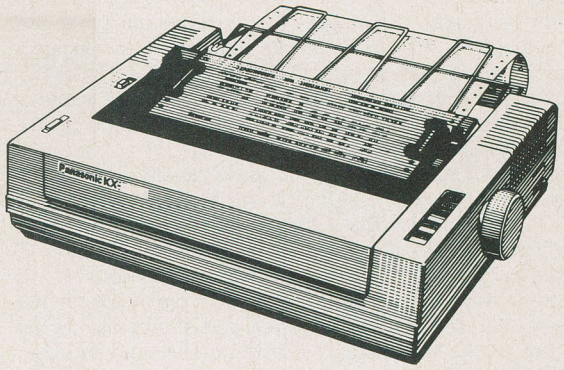

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The Art of the Sorted CP/M Directory

This specification is handled by CP/M by its placing a drive byte at location 5CH and the file name, padded out with question marks, beginning at 5DH. As such, it's fairly easy to use... we just pinch the drive byte and, optionally the file name unless the first byte of it is a space... in which case no file name was specified.

The program contains its own FCB, cleverly labelled "FCB", which is initialized with question marks. If no file name is found at location 5DH this will fly as it is. If there is a name it will be used to replace this total ambiguity.

Flinging BDOS call seventeen will cause the disk directory to be searched for the file in the FCB. If it isn't found the system will return 0FFH in the accumulator. Otherwise it will return an offset. The name itself will turn up somewhere in the DMA buffer.

The offset... yes, that did slip by rather quickly, didn't it... is the offset of the name of the file you asked for from the beginning of the DMA buffer, set here to 80H... well, sort of. Actually, to get the real offset you have to multiply A by thirty-two and add one. The multiplication is actually pretty simple... one just does five RAL... rotate left... instructions.

Flinging BDOS call seventeen will cause the disk directory to be searched for the file in the FCB.

Adding the resultant value of A to 80H will point to the first byte in an eleven byte file name meeting the specification given in the FCB. Having thus found the name one can move it to someplace safe. This arrangement is as funky as a lawyer on acid, to be sure.

Having once searched for a first instance of the file one can thereafter search for as many other occurrences as exist on the disk using the number eighteen BDOS call. It works in essentially the same way as the previous one, returning 0FFH in the accumulator when it finally runs out of entries.

This program throws these calls and places the resulting file names in a buffer... really just the memory after the last bit of the program. When the last call has echoed into the sunset the thing breaks out of its main directory loop and starts thinking about displaying its new found booty.

The files come off the disk in the order in which they were put on, rather than alphabetically. As such, it's necessary to rearrange them in the buffer, or, in the proper techno-babble, to *sort* them.

Sheepsort

Actually, the sorting technique used in this program is less of a sheepsort than a bubble sort. The sheepsort technique... placing a bucket full of sheepslop in one corner of a pasture full of hungry sheep and determining the fastest sheep by noting which ones get there first... is somewhat inapplicable to many programming applications as bytes don't run.

There are a number of kinds of sorting techniques... magazines like this one run articles about them from time to time. If you're a devotee of sorts you'll know that bubble sorting in among the least efficient of them. However, it's relatively easy to code and, with the relatively small number of potential entries as is found in a disk directory a faster sort would make no perceptible difference.

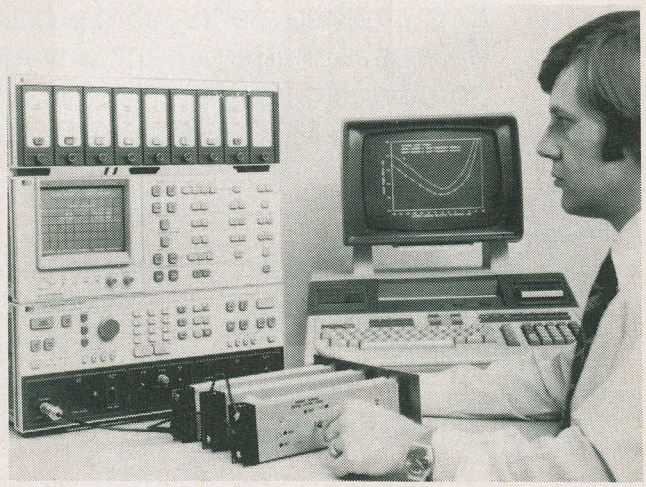
The principal behind a bubble sort is that you scan through a list of entries. Assuming that you want to sort them into ascending numerical... or alphabetic... order, you look at each entry and the one immediately following it as a pair. If the pair is in the wrong order you swap them and set a flag.

When the entire list has been scanned the bubble sorting routine looks to see if the flag is set. A set flag will send it back to reset the flag and run through the list again. In this way the entries will "bubble" up through the stack.

The bubble sort here is actually a pretty short one... I was rather pleased with it. It has a bit of a catch in it inasmuch as it must determine which of two strings should come first. In other words, it must look at the first two characters and, if they turn out to be the same look at the next two and the next two and so on until it finds two that don't match.

When the list has been sorted all that's left is to display the contents of the now reshuffled buffer in a useful manner. The directory will print each file name and its size in kilobytes.

The size specification presents two problems, to wit, finding it and showing it in decimal. The first is handled with a BDOS call which returns the number of sectors in the file in question in the FCB. This is not a very good way of handling this, as it's easily



confused and quite slow. However it will suffice for this example.

The size routine returns the sector count, which is eight times larger than the the kilobyte count would be. One adjusts this with three calls to the DIVH routine, which performs a sixteen bit right rotate on the HL register.

The DECOUT routine is one which has been pinched from the BIGMAC macro library presented in the July 1984 edition of Computing Now!. It's fairly straight up, recursively slicing up the H,L register until it gets down to the units.

Virgin Wool

There's a lot of fairly useful code in this program... even if you already have a more sophisticated D.COM. It should serve to illustrate a number of the trickier aspects of machine language programming... you can take these simple calls and rewrite dBASE II by yourself if you have a mind to.

You can also make this directory into much neater and slicker directory programs, spewing out all manner of information about the files being DIR'd. We'll be looking at more interesting directories in a future issue of Computing Now!. **CN!**

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Getting into your Kodiak foot sarcophogia and your goose filled parka . . . be sure to stun the geese first . . . and trudging out across the frozen tundra to the newsstand for your copy of Computing Now! may seem like a drag. For one thing, you have to trudge all the way back to your shack before you can check out the latest news, applications, software and equipment reviews.

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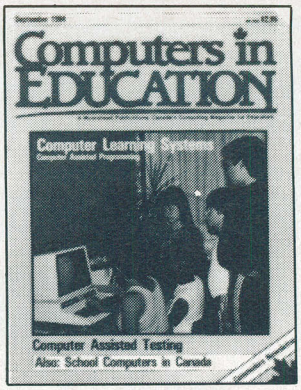

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There are news articles on the latest events and technology, beginner's guides to languages and software, software and book reviews, build-it-yourself projects, technical tips, and more.

In recent issues, for instance, Computers in Education covered the Icon educational computer and user's reactions to it, Logo, word processing for the classroom, simple cures for hardware problems, how disk systems work, a BASIC tutorial and more.

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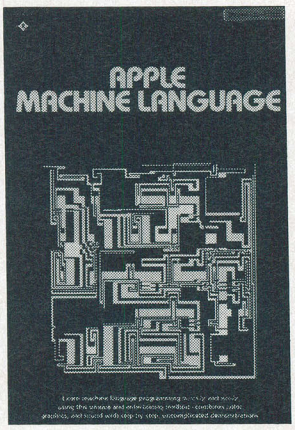

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Computer Faire Statistics

TORONTO, ONTARIO — In the final settling of the dust at the recent *Toronto Computer Faire* several cubic miles of statistical information was amassed. One compilation was of data concerning the magazines read by the show's attendees. Here's a quick tabulation:

Macleans	13%
Time	13%
Financial Post	3%
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Canadian Business	2%
Toronto Life	2%
Saturday Night	1%
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All other non-computer magazines	35%
Canadian Data Systems	1%
Computing Now!	8%
Computing Canada	1%
InfoAge	3%
All other computer magazines	67%

Model 2000 Upgrade

BARRIE, ONTARIO — Owners of *Tandy*'s TRS-80 Model 2000 can get even greater software compatibility with the IBM PC and other compatibles. **PC Maker**, a program offered free to all registered Model 2000 owners, allows MS-DOS or PC-DOS disk file transfers between the Tandy computer and either the IBM PC or similar compatibles.

The Tandy line of microcomputers is available at local Radio Shacks.

New PC Products

DON MILLS, ONTARIO — In addition to its new PC AT, *IBM Canada* has announced three new items for better PC productivity.

The **PC Network** allows the linking of up to 72 IBM PC's for program, peripheral and general information sharing. **PC XENIX**, a multi-user, multi-tasking version of AT&T's UNIX was introduced with applications programs. A multi-tasking program, **Topview**, allows PC users, through the use of windows, to operate in as many environments simultaneously as memory permits.

Software R&D

VANCOUVER, B.C. — The *Canadian Association of Data Processing Service Organizations* feels that the costs incurred in the development of software designed for sale to third parties should be **tax deductible**.

President Bill Boggs, during a meeting in Vancouver, stated that the federal government had been urged by the association to change its policy regarding software development costs.

The association feels that, excepting post-sale maintenance costs, software development can be categorized, and should be tax deductible, as research.

PCjr WordStar

SAN RAFAEL, CALIFORNIA — Following IBM's introduction of an improved typewriter keyboard for their PC-jr, *MicroPro International Corporation* has made a version of **WordStar** available to PCjr users.

Selling for $195 in American funds, the program permits disk-based file transfers between the jr and IBM PC.

Dirty drive heads are a major reason for data loss. *Budgetron Inc.*, is the exclusive Canadian distributor of **RSI Computer Care** products. Available are the computer care kit for terminal and disk drive maintenance, the wet process diskette kit and a dry process diskette...

Circle No. 51 on Reader Service Card.

A 16-bit upgrade for the TRS-80 Models I, III, 4 and 4P computers, *Micro Projects Engineering*'s **Xcaliber** allows user to read, write and execute much of the available software for the IBM PC. When combined with an optional video display card, programs such as Lotus 1-2-3 and MultiMate may be run...

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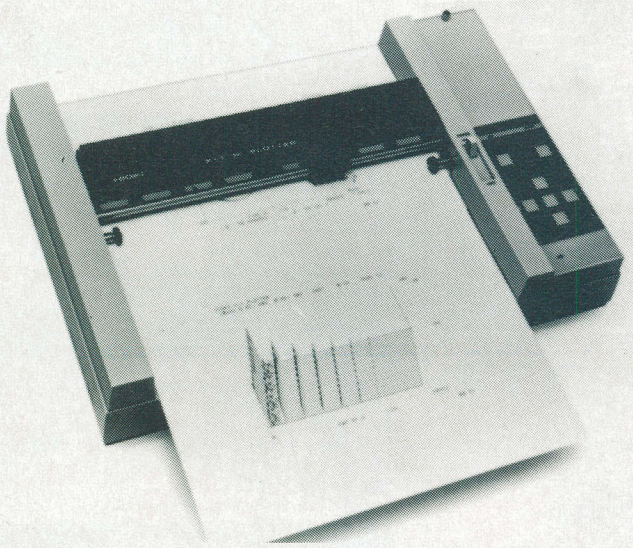

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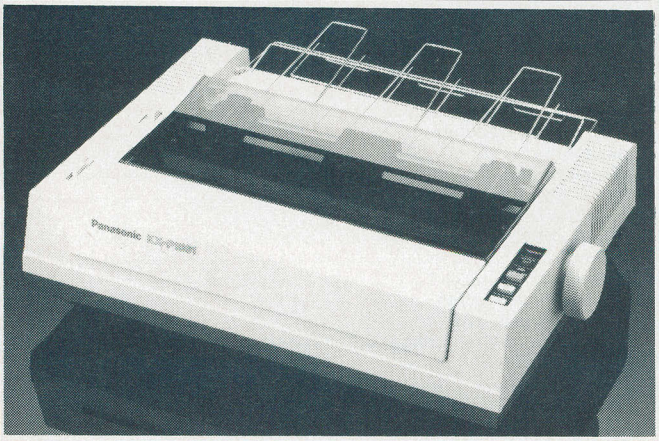

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The Apple //c, with its inherent serial ports and lack of I/O slots, is usually unable to interface to parallel printers. The **Granny Smith Connection** from EcoSea Technologies Corporation, however, permits connection to any graphics-capable Centronics standard printer...

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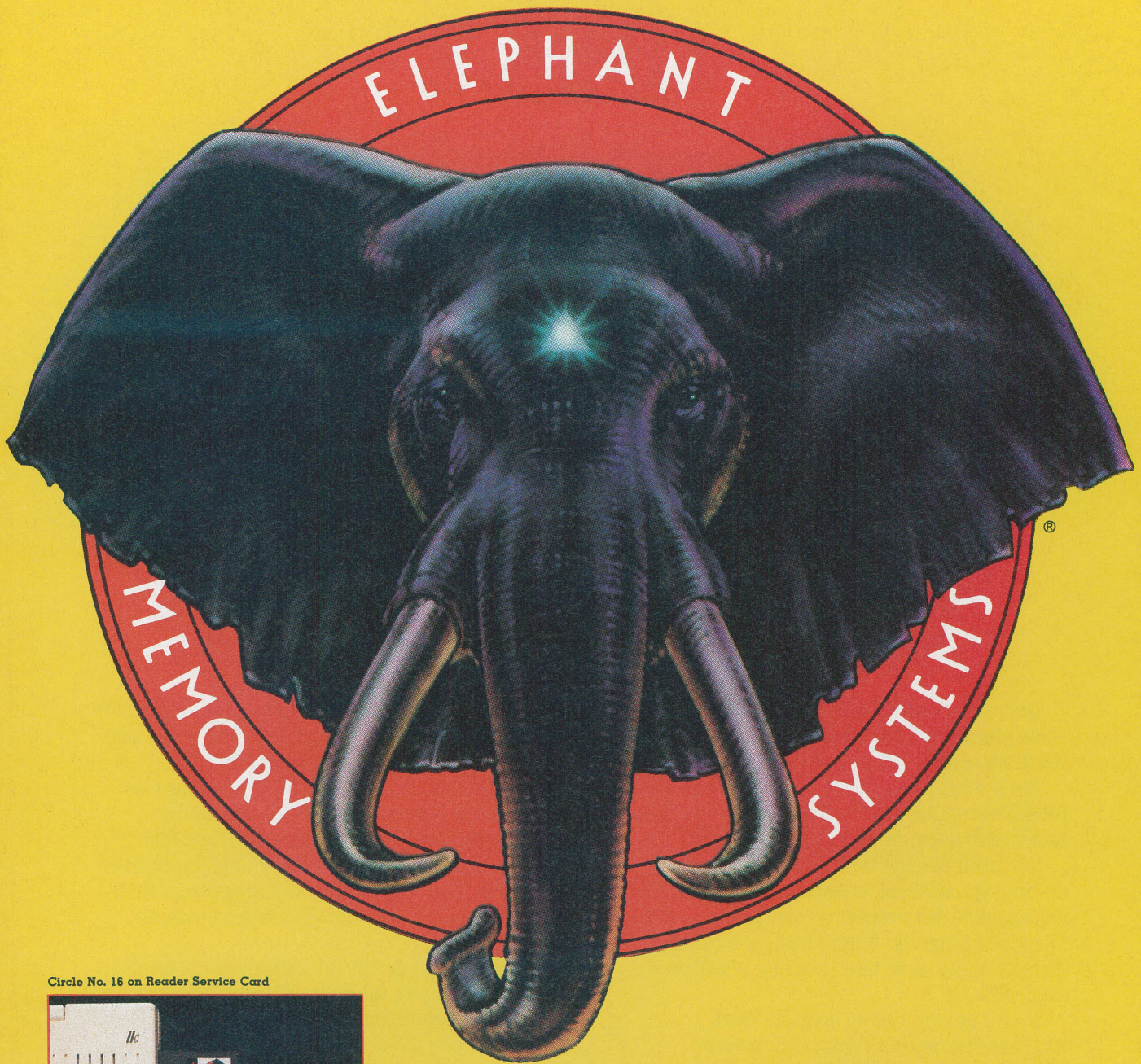

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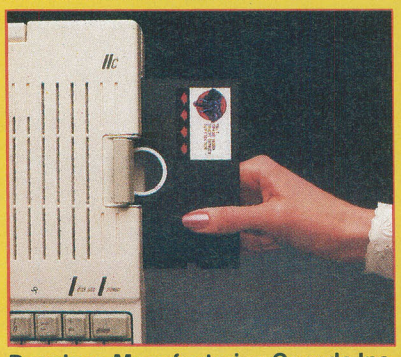

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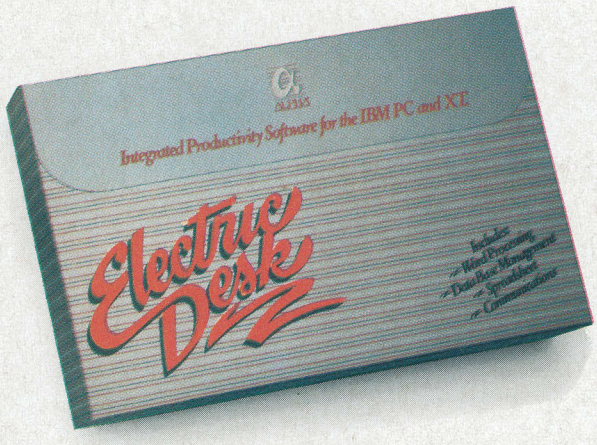

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